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| 09/727,358      | 11/30/2000  | Toru Ishimoto        | 116-001940          | 3393             |

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EXAMINER

QUASH, ANTHONY G

ART UNIT

PAPER NUMBER

2881

DATE MAILED: 10/03/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

09/727,358

Applicant(s)

TORU ISHIMOTO

Examiner

Anthony Quash

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-7 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-7 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

## Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 4.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: .

***Priority***

Acknowledgment is made of applicant's claim for foreign priority based on an application filed in Japan on November 30, 1999. It is noted, however, that applicant has not filed a certified copy of the 11-340569 application as required by 35 U.S.C. 119(b).

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-7 are rejected under 35 U.S.C. 103(a) as being unpatentable over in Liu [588] view of Lee [579]. As per claim 1, Liu [588] teaches a method of inspecting the state of a large number of holes formed in a wafer sample by directing a charged-particle beam to the sample and obtaining resulting signals, the method comprising the steps of establishing measurement regions containing holes on the sample and directing the charged particle beam to the measurement regions on the sample containing holes. See Liu [588] abstract, figs. 5,8, col. 8 lines 1-50, and col. 11 lines 1-30. However, Liu [588] does not specifically state detecting an electrical current flowing between each of the measurement regions on the sample and ground, finding data about a current distribution on the sample from detecting values of electrical current,

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and displaying a brightness-based map on a display unit according to the found data about the current distribution. Lee [579] does teach detecting an electrical current flowing between each of the measurement regions on the sample and ground, finding data about a current distribution on the sample from detecting values of electrical current, and displaying a brightness-based map on a display unit according to the found data about the current distribution. See Lee [579] abstract, col. 2 lines 15-50, col. 3 lines 35-50, col. 4 lines 10-30, col. 55-65, col. 5 lines 5-10, and 45-50. Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to detect an electrical current flowing between each of the measurement regions on the sample and ground, finding data about a current distribution on the sample from detecting values of electrical current, and displaying a brightness-based map on a display unit according to the found data about the current distribution in order to obtain a good image contrast as taught by Lee [579].

As per claim 2, Liu [588] teaches the size and positions of the measurement regions being so set that plural holes are present within each of the measurement regions. See Liu [588] fig. 5.

As per claim 3, Liu [588] teaches the regions irradiated with the charged particle beam being located in certain positions within periodic patterns formed on the sample. See Liu [588] fig. 5.

As per claim 4, Liu [588] view of Lee [579] teach all aspects of the claim except for the charged-particle beam being scanned across each of the measurement regions, and wherein the electrical current is accumulated during scan and a resulting value is

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used as a measurement value derived from each measurement. It would have been obvious to one of ordinary skill in the art at the time the invention was made to have the charged-particle beam scanned across each of the measurement regions, and wherein the electrical current is accumulated during scan and a resulting value is used as a measurement value derived from each measurement in order to determine the fluctuations in current between different areas.

As per claim 5, Liu [588] view of Lee [579] teach all aspects of the claim except for the charged-particle beam being scanned across each of the measurement regions, and wherein an average value of the electrical current during the scanning period is used as a measurement value derived from each region. It would have been obvious to one of ordinary skill in the art at the time the invention was made to have the charged-particle beam being scanned across each of the measurement regions, and wherein an average value of the electrical current during the scanning period is used as a measurement value derived from each region in order to determine how the current varied with respect to the region of interest.

As per claim 6, Liu [588] view of Lee [579] teach all aspects of the claim except for the measurement regions being totally irradiated with the charged particle beam for a given time in a static manner, and wherein the electrical current is accumulated during the given time and a resulting value is used as a measurement value derived from each measurement region. It would have been obvious to one of ordinary skill in the art at the time the invention was made to have the measurement regions being totally irradiated with the charged particle beam for a given time in a static manner, and

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wherein the electrical current is accumulated during the given time and a resulting value is used as a measurement value derived from each measurement region in order to determine which areas where the most conductive.

As per claim 7, Liu [588] view of Lee [579] teach all aspects of the claim except for each of the measurement regions being totally irradiated with the charged-particle beam for a given time in a static manner, and wherein an average value of the electrical current is used as a measurement value derived from each measurement region. It would have been obvious to one of ordinary skill in the art at the time the invention was made to have the measurement regions be totally irradiated with the charged-particle beam for a given time in a static manner, and wherein an average value of the electrical current is used as a measurement value derived from each measurement region in order to determine which region had the largest amount of charge build up.

### ***Conclusion***

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. U.S. Patent Nos. 6,426,501 to Nakagawa, and 6,366,688 to Jun et al. and 6,344,750 to Lo et al. are considered pertinent to the applicants' disclosure because of there discussions on a defect-review SEM reference sample for adjustment thereof method for adjustment thereof and method of inspecting contact holes, and an apparatus and method for contact failure inspection in semiconductor devices respectively. U.S. Patent No. 6,344,750 to Lo et al is also considered pertinent to the applicant's disclosure because of its discussion on a voltage contrast method for semiconductor inspection using low voltage particle beam.


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Any inquiry concerning this communication or earlier communications from the examiner should be directed to Anthony Quash whose telephone number is (703)-308-6555. The examiner can normally be reached on M-F from 9 a.m. to 5 p.m.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John R. Lee, can be reached on (703)-308-4116. Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703)-308-0956.



A. Quash 9/30/02



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